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A Tuberculosis Hospital & Sanatorium

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A TUBERCULOSIS HOSPITAL AND SANATORIUM

BY

STRAWN ALDRICH GAY

THESIS

FOR

DEGREE OF BACHELOR OF SCIENCE

IN

ARCHITECTURE

COLLEGE OF ENGINEERING

UNIVERSITY OF ILLINOIS

1913

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UNIVERSITY OF ILLINOIS

June 6, 1913

THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

Strawn Aldrich Cay

ENTITLED A Tuberculosis Hospital and Sanatorium.

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE

DEGREE OF Bachelor of Science in Architecture

Frederick M. Mann

Instructor in Charge

APPROVED: Frederick M. Mann

HEAD OF DEPARTMENT OF Architecture

247380

PREFACE

For assistance in working up the dravings I am indebted to my instructor and Professor Fredrick M. Mann.

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PROGRAM.

Tuberculosis is a videspread and deadly disease, but it has been discovered that plenty of outdoor air and sunshine is a means of curing it. Therefore, the solution of this problem will consist of securing the best arrangement of buildings, a free exposure to air and sunshine, the best form for subsequent addition and development of the perfect tubercular hospital.

It is proposed by several wealthy men to erect such a hospital as a memorial, which after built, will be self-supporting. It will be an institution for the treatment of incipient pulmonary tuberculosis only. It will be conducted as a high grade private institution; its patients being of the wealthier class of people, who are able to pay well for good care and pleasant surroundings.

Accommodations for about sixty patients will be required.

This institution is to be located on the north bank of the Illinois River, three miles west of Ottava in LaSalle County on a piece of land known as "Buffalo Rock". The site is a level plateau of about forty-eight acres, on a bluff which rises directly up to a height of seventy-five feet above the surrounding country. It affords an unobstructed view of the picturesque scenery of the fertile lowlands of the Illinois for miles around. The plot of ground is 7,920 feet long, 1,056 feet in width at the ends and widens out at the center to 1,584 feet. The thick growth of pines affords adequate protection

from the cold north winds.

At the foot of the rock running east and west parallel to the axis of the rock lies the public highway, Chicago, Ottawa and Peoria Railway, and the main line of the Rock Island Railroad, thus affording convenient and rapid transportation to and from town.

The institution will consist of three departments which may or may not be accommodated in three separate buildings. If the latter scheme is adopted, they should be connected and easily accessible from one to the other by means of covered passage ways, pergolas, or any similar treatment.

The Administrative section will consist of all reception rooms for the public, lounging, amusement and dining room for the patients and rooms for the employees, nurses, etc.

The Patients section will consist of a suite of rooms for each patient and the patients may or may not be segregated.

The Medical section will consist of all rooms for medical facilities, operating, laboratories, etc.

The general of rooms needed in the various buildings will be as follows:

ADMINISTRATIVE SECTION.

Public Reception Room	Kitchen	Bath and Toilets
Lourging Room	Store and Refrigerating	Nurses' Quarters
Offices		Employees Quarters
Coat Rooms	Sewing	Elevator (if needed)
Amusement Rooms	Dietian	Trunk Lift.
Dining Room	Linen	

PATIENTS' QUARTERS

Night Room	Shower	Porch
Dressing Room	Toilet	Closets

MEDICAL SECTION

Office	Operating Room	Anathetizing Room
Reception Room	Sterilizing Room	Toilet and Bathroom
Nose and Throat Room	Wash Room	Nurses Quarters
Examining and Drug Room	Nurses' Office	X-ray Room.
Laboratory	House Physicians' Office	Research Laboratory and Locker Room.

The buildings will be treated in a light and attractive manner, displaying verandas, terraces, arbors and other similar features. The patients will possess the feeling that they are here for their usual recuperative vacation, the beautiful surroundings causing them to forget their ailments.

The buildings are to be constructed of any material commonly used in the locality.

Careful attention will not only be given to access to the grounds from the road, interurban, railroad and river, but the treatment of the grounds will be inviting in its character and should be carefully studied with that end in view.

DRAWINGS PROPOSED.

(1) First floor plan including immediate surroundings.

(2) Second floor plan of group.

(3) Main elevation of group.

(4) Section three, - the three buildings.

(5) Perspective sketch.

(6) Sheet of details.

DRAWINGS SUBMITTED.

(1) First floor plan including immediate surroundings, at 1/16 inch scale.

(2) Second floor plan, at 1/32 inch scale.

(3) Main elevation of group, at 1/16 inch scale.

(4) Section through group at 1/16 inch scale.

(5) Perspective sketch.

EXAMPLES.

(1) A design which attracted a great deal of attention is that of King Edvard VII Sanatorium erected in Midhurst in Sussex. A few years ago a competition vas held for the best essay on a sanatorium for consumption in England, Sir Ernest Cassel having placed $1,000,000. at the disposal of his majesty, the king"for any philanthropic purpose he might have in view." The prize of $2,500. was duly awarded, but the sanatorium was not built according to prize plans, but from those prepared by Mr. Adams, vho paid a special visit of inspection to the most modern sanatoria in Europe so that his plans may be considered as embodying the best and latest practice in this branch of hospital vork. The site consists of 171 acres and is 495 feet above the sea level, backed and protected by a lofty pine group. It will accommodate one hundred patients, fifty male and fifty female. Cost is estimated at $375,000.

(2) Agnes Memorial Sanatorium, Denver, Colorado, Grove and Walsh,architects. The institution when first constructed consisted of an administration building, two pavilions and a medical building. The floor plans were outlined by Dr. G. Walter Holden and adapted to the Spanish style of Architecture. The pavilions are two stories high with porches around the entire structure on both floors. Every patient is housed in a separate bedroom eleven feet wide by thirteen feet long, containing a radiator, a ventilating register and closet three feet by five feet. The rooms open upon a central corridor upon

one end and upon a veranda space eleven feet four inches by eight feet deep at the other end. This can be curtained off by sliding curtains in order to make private space when desired. The roofs of the porch are raised to a height that will allow sunlight to penetrate each room at some time during the day. It has a capacity of forty patients, and cost $250,000. and was equipped for $50,000. additional.

(3) Cragmore Sanatorium, Colorado Springs, Colorado, is one thousand feet long. The dining room is placed to obtain full advantage of the morning sun. It has a capacity of one hundred patients, eighty-eight special suites, consisting of sleeping porch, private bath and a room which is meant for a dressing room or sitting room rather than a bed room, the idea being that the patient will sleep outside on porch in good weather. To prevent one patient from disturbing another it was necessary to separate sleeping porches and to prevent one adjoining another as much as possible. All stairs are shut off from hallways so that air will not penetrate from lower to upper stories.

(4) Vermont Sanatorium, Pittsford, Vermont. Slopes and Feustmann, architects. Sixty to seventy-five patients are provided for. The sanatorium consists of an administration building to which are connected the men's and women's quarters by means of covered ways, protected on the north side by storm sash. The main building contains medical and business administration, domestic arrangements and dining accommodations, small library and general living rooms, quarters for the interne and separate coat rooms for men and women. The second floor is

mainly given over to the uses of the infirmary. In the second story over the medical wing is located the quarters of the women's staff. In the dining room and living room, there a large number of patients congregate, special ventilation is provided, but in the balance of the institution only direct heating and natural ventilation is used. Each patient has his own porch connected with his own bedroom.

HISTORY OF THE HOSPITAL.

The word"hospital" has its derivation in the latin "hospitalis"(adj) and from the noun"hospes", a host or guest. The place in which a guest was received was in latin "hospitum", from which was derived the French "hospice." In time the adjective became used as a noun and the words "hospitalis," "hospitale", now "hospitale" and "hospitalia", were adopted. The English word "hospital" comes from the old French "hospitale", as do the words "hostel" and "hotel" all originally derived from the latin. The three words, "hospital" "hospice" and "hotel", although from the same source, are used in different meanings. The first, "hospital", usually means establishments for temporary occupation by the sick and injured; the second, "hospice," a place for permanent occupation by the poor, the infirm, the incurable or the insane; and the last, "hotel," dwellings either public or private, for ordinary occupation.

One need only read pre-christian history concerning hospitals and dispensaries to find authentic and interesting information regarding the curing of the sick, the instruments and medicines used, and the places provided for housing them in sickness.

The progress since the civil war in building hospitals has given great impetus to broadening some of the general principles of their construction. Formerly they were not well constructed, because there were fewer standards. Medical science grew slowly, and naturally hospitalls had a parallel development.

Since the advent of aseptic surgery new principles have been evolved, revolutionizing old tenets and throwing new light upon the fundamental laws of construction. During the last century these principles have passed through three stages. First, "heap of buildings" full or ornamentation, with extension of surface in every conceivable form, both outside and inside the walls; second, the assumption that a building for sick people must become so choked and impregnated with disease germs as to be surgically unclean and hence unfit for safe occupancy, and that inexpensive one storied buildings should be erected, these to be destroyed and renewed every ten or twelve years. But the advent of aseptic surgery soon taught us that it was not the germs lodged in a building that brought disaster, but the want of surgical cleanliness in all the persons and things that had to do with the patient. This aseptic surgical period brought departure from the one storied building to those of several stories, but recognizing new hospital principles, they combined every feature ingenuity could suggest for the cleanliness of buildings, as well as absolute clearliness of persons, instruments, beds, linen and utensils. This new point of view together with the extended uses of steam, with electricity which permitted power to be transmitted where previously steam was impracticable, combined with new and well adapted building materials in the surgical sense, gradually evolved a better type which is now accepted as the present standard. The general arrangement of a hospital group, the various ends to be attained for the different kinds of work, have become better understood. It is now clearly appreciated

that hospitals, like other architectural specialties, are a distinct class of themselves, and require a specific treatment quite different from other buildings.

In the decade of 1890-1900 the increase in hospital incorporation was more marked than before, and the past three or four years show still greater increase. At the present time there are, according to a careful compilation made by Mr. Sutton of the National Hospital Record, at least twenty-five hundred hospitals in this country, not counting those private hospitals and infirmaries connected with various institutions, schools, alms houses, etc., or asylums and retreats. On investigation it was found that about ninety per cent were housed in adapted (or rather ill adapted) residences; that the officials frankly admitted they had nothing worth studying or copying, and the remainder, some of which were new and expensive buildings, were generally designed by an architect of brilliant attainments, yet he was totally unfamiliar with even the rudiments of hospital requirements. The result is certainly extremely disappointing, but a new era seems to be dawning. Some of the leading architects of the country are now doing work that will in time evolve a standard that will be far in advance of anything heretofore attained, here or abroad.

Tuberculosis is no new disease, but sanatoriums for the treatment of tuberculosis patients are quite a development of our own day, for it is only within the last half century that the possibility of curing consumptives has been recognized. Until quite recent years the idea of exposing a delicate person

to all the variations and inclemencies of the weather was scouted as madness, yet the results achieved, more particularly in mid-Europe prove beyond doubt the excellence of the treatment.

Germany has given first attention to the provision of such buildings, and, as a result, hospitals and sanatoria are to be found all over the German Empire.

The so-called sanatorium treatment for tuberculosis has demonstrated the possibilities of the open air, sun and diet "medicine", and it seems to be gradually dawning on the medical fraternity that those methods which were thought so extravagant and extreme when they were demonstrated by the early German enthusiast fifteen or twenty years ago, are, to a greater or lesser degree, applicable to disease all along the line.

The sanatorium has gradually gone through an evolution of various types;- earliest sanatoria were ordinary houses. Given the essential requisites of location, all that was sought was a place in which the patients could sleep, disciplinary treatment was relied upon for the rest. A reputation for the cure being established, buildings became larger as demands for accommodation increased, and many houses grew into hotels. Gradually the development of the sanatorium was led to a type with a corridor on the north and rooms on one side only.

Another branch of development has been the aggregation of patients' quarters around a central administration building. A third type is the large hospital with wide verandas

on the scuth side of the rooms, where the open air treatment is practiced by placing couches on the verandas and on these the patients are reclined for eight or ten hours a day. Another manifestation of the same idea, even in buildings not specially erected for sanatoria has been the construction of what in Germany vas called liegehallin, or reclining halls. These are one or tvo storied verandas enclosed on three sides and open to the south. They are very general in Germany. Most of these buildings on the continent are two or three stories high, as though the barracks were the motive adopted, and as experience taught the managers that the patient must come out of his nightly domocile and could not be going constantly up and down stairs provision had to be and was made for his resting during the day in shelters in the open air.

GENERAL REQUIREMENTS.

Mr. H. M. Rove, M.D., Medical Department of Boston City Hospital says, "A hospital of any class or size, to be successful in its work, must in every case conform to at least three well recognized curative agents. First, plenty of sunlight. Experience emphasizes the importance of this factor. The architect should study and restudy his problem, prove and prove again, keeping this as the first and greatest principle to which he must adhere, and just in proportion as he departs from it will his building be a failure.

Second, every part of a hospital as far as possible and especially all rooms in which sick are treated should have a plentiful and assured supply of pure air of standardized quality, temperature and humidity. Most architects expend more labor in the attempt to attain this well recognized desideration, and give to it more thought than to the question of sunlight.

Third, in the general arrangement of the building and in all the details, outside as well as inside, the greatest consideration could be given to the problem of how to promote and insure cleanliness. An exterior laden with ornamental ornamentation may be pleasing to the eye, but may not conduce to cleanliness. So, also all interior details must be tested by the ease with which they may be kept clean, every part being continuously free from whatsoever impairs the cleanliness of the patients according to the highest standard, the room they occupy, the air they breathe, the multifold things used for their recovery and obviously also the most careful personal

hygiene of doctors and nurses. A hospital so constructed that it cannot supply these three indispensable factors is a departure from the best type. To these three indispensable factors sunlight, pure air, cleanliness, may be added a fourth, fire proof construction. History shows that all wooden hospitals are ultimately destroyed by fire, and sometimes even the occupants are consumed. Where reasonable opportunities exist, even in city locations, hospital buildings should be constructed on the pavilion plan, not over three stories high and not over ninety patients in a building as an access of this number approaches the danger line.

The most difficult problem confronting the designer of a small hospital is that of specialization and classification. It is manifestly impossible to idealize in this direction to the extent usual in a large hospital of several hundred beds, yet it is evident that great progress has already been made.

It is a waste of effort to attempt to argue the question of a single building, (called a block hospital) or an aggregation of three or more buildings (called a pavilion hospital). The evidence is overwhelmingly in favor of the pavilion principle and all experts are united in their judgment that the best results can be attained by the complete isolation in different buildings. The reasons are obvious. In this, as in all analogous problems the greatest success is possible only in getting back to nature. Civilization seems to demand a gathering together of large numbers of individuals within the smallest space and the evils and diseases of civilization result. Expensive methods of construction and cose of service

seem to demand the congregating of a large number of sick people in one room, the open or congregated ward,and sometires a number of these wards under one roof. These customs may seem necessary, but are contrary to nature, and if good results it is in spite of adverse conditions.

If one goes to the bottom of the subject he will come to feel that it is best to provide in every way possible for individualizing the treatment.

In spite of all the well understood and absolutely vital reasons for separating the various sexes and providing entirely isolated buildings for each department, each thoroughly equipped for its special work, we meet people who argue in favor of a single building on the score of less cost to build and maintain.

As to the cost of construction,at first glance it would seem to be much cheaper to build one large structure than several small ones, but a careful study of the problem will convince one that this is not always true.

In the first place a large building seems to require a large expense for ornamental features in the way of breaks in the exterior walls, gables, cupolas, belt courses, etc. Unless it is treated in a comparatively ornate manner it is quite apt to look like a factory.

Again, if a large and high building, the construction must necessarily be of a heavier and more expensive character.

In a group of several small buildings there seems to be little or no need of strictly ornamental features.

The material, grouping, and lights and shades of the various pavilions connected by corridors, varied by the necessary solaria and airing balconies, give all the picturesque elements that can be desired, and the general effect should be attractive looking, the hospital,yet unassuming, homelike and not enough institutional to be repellant.

Again few, if any, hospitals are built and finished complete to the ultimate capacity at once. In a small town of stationary character as regards increase in population or in case of a hospital for a special purpose or one built or endowed by an individual, it is possible and necessary to limit the growth and usefulness of the institution by arranging for a complete whole to be immediately realized. In a hospital the ultimate possible growth must be carefully calculated and the entire proposition in all its varied elements and possibilities carefully planned, then if funds for but one or two of the buildings are available, those can be temporarily adjusted to the requirements of the complete hospital use, and the remaining buildingsadded as the funds are supplied and the needs are made evident. It is thus clear that the pavilion principle of planning is the only possible solution of the problem in at least nine-tenths of the cases one meets in general practice but a portion of the building is at present developed and the additional building will be built as needed. It is quite customary in the present day to build a hospital of fifty to one-hundred beds in six or eight buildings. There should be an administration building with a detached or semi-detached service building. In the rear of the group should be the boiler house

and laundry and male and female patients' quarters with private rooms and all conveniences.

In designing a hospital scheme the future should be discounted for at least twenty-five years, if possible. In some cases this is very easy, for the community may be a stationary one with no possibility of a growth. In such a case it is very obvious what to do, and realization of a complete perfect scheme would simply depend on the architect and money. In many places, however, there is an evident need of possibly a twenty-five bed hospital to start with, and a just as evident probability of a need for a hundred bed hospital within fifteen or twenty years. In such cases the only safe economical proposition is to lay out as complete and highly specialized a scheme as possible and to build and develop along the lines of this scheme as the funds come to hand and the needs manifest themselves. Much money has been wasted and much trouble has ensued by not following this, the only reliant or businesslike course.

There are great varieties in plans, some building straight;some T shaped; some crescents; some like an inverted U, the center straight; the arms opened out at angles of 110 to 160 degrees; some cruciform. For moderate sized sanatoria, preference should be given to the open U plan.

The one story building previously was considered best for the patients, while in larger institituions the two storied gave better concentration for the staff. The one story, however, is more expensive when foundations, roofs and sanitary apparatus are taken into account. For a number of years the

popular idea was that a pavilion should never be over one story in height and this rule has been followed until within a short time, almost invariably in the smaller hospitals. Even in some of the larger hospitals the prejudice in favor of the one story pavilions has been so strong that such pavilions have been even where pavilions of two or more stories were needed. Today it seems to have been fully demonstrated that, if properly arranged, there can be no objection to a pavilion of two or even four or five stories. The upper floors are always more attractive, better lighted and have better air, less dust and noise than the lower. Principal objection to a two story pavilion seems to be that an elevator will be necessary for use in moving patients. A few years ago this would have been a serious matter, but today with the automatic electric and extremely simple and safe hydraulic plunger elevators that require no attendent and the slightest engineering attention there can be no objection to an elevator. Without an elevator the service would be no more difficult over one flight of stairs than through forty or fifty feet of the same floor if it were in an adjoining pavilion. The elevator is necessary, however, for patients.

The earliest hospitals contained only congregated wards and very seldom, if ever, rooms or wards for single beds.

In America there has been a gradual evolution from the pavilion with open ward and toilets to a highly perfected scheme of open wards, solaria, nurses' room, toilet and bath, two bed wards, isolated private wards with special toilet, bath and solaria, with the necessary diet, kitchen, linen and clothing

room, etc., as shown for instance, in the male and female medical and surgical pavilions.

There were times when travelers were willing to sleep in a hotel room with several fellow travelers in separate beds in the same room. Two bedrooms are still quite common in some parts of the country today. Not so long ago one bath to a floor did very well in the average hotels. Today, however, travelers demand a separate room, and generally a private bath, and they are willing to pay extra price.

So in hospitals a few years ago all patients suffered, were interviewed by friends, examined by medical staff, consoled by the minister and generally died in public, as it were, the subject of interest to fellow sufferers on all sides, sometimes protected by a screen and sometimes not.

People are becoming more intelligent and more sensitive and highly organized, demanding a private room, or, if unable to pay for this, the small two or three bed ward.

From the sanitary point of view Mr. Hall believes the long central corridor was not to be recommended for patients and even with one corridor sanatoriums recommended that there should be ample windows in the outer wall of the corridor, with corresponding openings in the walls of the rooms, so that air might blow right through.

Two essential details in design are that all windows or openings should be carried up to the ceiling, so that all parts of the rooms or corridors may be scoured with fresh air and that sanitary apparatus should be external to the building.

It was considered that with such provision, a minimum of 1,000 cubic feet of air per person was sufficient and a ceiling height of from ten to twelve feet. Single bed wards should be the rule. Floors should not be laid on the ground, but should have a large ventilated space beneath.

When the building is more than one story in height there should be no way by which the vitiated air from the lower story might ascend to the upper one.

In a hospital building of any kind innumerable points of planning are governed by medical or surgical requirements; and though perhaps in respect to domestic houses too much has been said about influence of aspect, arrangement, etc., it is essential in a hospital building where the body resistance of the patients may be taken at its lowest point, that every thing tending in the smallest degree to their comfort or welfare should be studied, and with sanatoriums this is especially the case. The ruling requirements are pure air and sunlight and everything in the building has to be carried out with these two requirements in view. Dust is very harmful. It is a fact that the bacillus of consumption finds a ready haven in any dust, living as long as two and one-half months even in the dust of an ordinary room, so that not only must the site of the sanatorium be free from dust, but every precaution has to be taken in the interior to prevent accumulation of dust, this end being secured as in hospitals, by rounded angles in all rooms, absence of mouldings, and impervious walls and floors. As the sun is so potent a factor in the case,

the patients' rooms must have a sunny aspect and be ventilated with a flood of fresh air. It must be remembered, however, that although the most delicate patient can be kept out of doors in all weather with impunity, provided the exposure is constant, it is necessary to guard against drafts of any kind, and winds also, as these bring on coughing, which is always bad. Moreover anything which tends to excitement has to be avoided. This again finds its recognition by the architect in planning a sanatorium, recreation halls for patients' use and dining halls for meals only, because patients here congregate and the air becomes appreciably infected and deteriorated.

The pioneer era in hospital construction when building were satisfied to secure a maximum of accommodation for a minimum of expenditure has passed away. Stability of construction, convenience of arrangement, beauty of form, and a special adaption of every portion of the hospital buildings to the best care of the sick are now considered essential for a good home for the modern hospital. From the experience of the past quarter century we have learned;-

(1) Hospitals should be built upon the pavilion plan to secure the best arrangement of buildings, a free exposure to sun and air, the best form for subsequent addition and development, and, in short, the most favorable conditions for the evolution of the perfect hospital.

(2) The material used for construction should be brick with stone or terra cotta trimmings or ornaments or, more recently, stucco on tile, as offering less expensive construction, large openings for sunlight and air, increased

protection from fire, drier and consequently more hygienic apartments, better opportunities to secure walls with air spaces and room for heating and ventilating flues; and a higher standard for general construction than is possible by the use of any other material.

(3) Stone is the most expensive building material for a hospital, becuase to secure fireproof construction or flues for ventilation or heating the interior must be lined with brick. Walls constructed of stone are necessarily thick. The openings for light and air are thus diminished in size.

(4) Wood is wholly unfitted for the construction of a large hospital building or buildings, because such structures are frail, insecure, temporary, liable to destruction by fire, prone to become a breeding place and a refuge for vermin and a nedus for germs of disease. Such buildings cannot be kept in a sanitary condition without great labor; they are expensive to keep in repair, and are liable to constant damage and deterioration from daily wear and tear, and, above all, they are almost certain to be destroyed by fire.

Stone as a building material is undoubtedly capable of such handling as to furnish structures of higher forms of beauty which may possibly be more fitting monuments to the memory of departed benefactors, but its expense renders it out of the question to build every part of a hospital of such high priced material. Hence wherever stone is used, there is a tendency to build the exposed portions of stone and to piece out the less conspicuous parts with brick, as a cheaper and equally durable material. From a standpoint of consistent, uniform

and appropriate construction, it is preferable to have all buildings of the same material, as more pleasing and permitting upon the whole a higher standard of construction. Hence a hospital built wholly of brick or stucco is preferable to one built partly of brick and partly of stone. The experience of the past quarter century has equally demonstrated that the hopes engendered by the civil war, then an era of cheap because temporary hospital construction had been attained, could not be realized. It was found that the so-called temporary structures had a perennial life, and became permanent not because they were good and well fitted for use, but from a mistaken notion that when the time had come for their destruction they were too good to throw away. They were too valuable to destroy, and too worthless to repair and like halfworn garments, they proved sources of embarrassment to their occupants, and invariably became dilapidated, unsanitary and unsightly. It is apparent that a hospital building will be permanent whether well built or not, and it is consequently of prime importance that it should never, except in the case of field hospitals or a cottage hospital, be constructed of wood. In some of the older hospitals, the mistake has often been made to patch up the old and obsolete buildings, or to construct new and improved buildings, for the accommodations of a portion of a hospital, which, in other portions, may be unsightly and ill adapted to hospital uses.

That the suburban hospital, properly planned, located amid ideal surroundings possesses essential advantages our city hospitals, large or small, must be evident to all.

However perfect the scheme of ventilation is, it is absolutely impossible to rival or approximate to the vitalizing, bracing and lifegiving purity of the air of an elevated country hospital site. Considering the vile combination of deadly gases, the myriad of germs and micro-organisms and the great amount of filthy dust that comprises so large a percent of the air in our large cities - elements to be sure, that can be partially negatived by straining and washing by elaborate and expensive devices,- we can but feel, then; that there are vastly more reasons, and these of more vital importance for a country location especially for surgical work and for a disease as tuberculosis, having the possibility of a long convalescence.

During the civil war the army hospitals statistics showed startling contrasts in favor of the hospitals located back in the country, at an elevation, among the hills. A study of the existing hospitals in this country and Europe seems to demonstrate the fact that in nine cases out of ten the lot of land originally purchased is too small. This is especially true of British and European hospitals, where in numberless instances the building covers a very large per cent of the land. For a hospital of fifty to one hundred beds there shall be at least five to ten acres of land. A hill top is an ideal location, making it possible to build above the general lay of the town, giving greater isolation, better views and air and better drainage.

One feature of hospital planning which has thus far received too little attention is that of grounds and accessories. There are very few hospitals that have made use of evident

possibilities in landscape architecture. If the grounds are restricted or the outlook undesirable in any direction (although these two faults should not exist) everything possible should be done by the introduction of judicious planting and little formal gardens with walks and seats for convelenscents. As long as it is impossible to introduce decorative details and accessories in the patients' rooms, every possible use should be made of the opportunity to make the immediate surroundings as beautiful as possible.

There should be an inclined plane from every solarium or airing portico to enable convalescents to walk or be wheeled down to the garden paths or out over the lawns. It makes little difference how the proposed hospital lies with reference to the street or streets, the general axis of the group of buildings should be east and west, and the entrance and service drives can be handled in a formal or informal manner as the contour of the site may permit.

In practically all cases the site selected has open prospects (generally toward the south) with shelter from the north, and with extensive areas for exercise, in other words, dry sites at bracing altitudes, aspects with the maximum of sunlight for the patients' rooms, protection from chilling wind and sleet and open air living, were regarded as essential for the reinvigoration of the invalid, while broad aspects were mentally stimulating, widening the interests in life and incalculating hope in the future. Pine woods as a screen were much appreciated for their exhilarating resinous

aroma, and the sandy soil in which they thrived was considered the best on which a sanatorium could be situated.

SOLUTION OF THE PROBLEM.

Site:- In selecting a site in the open country for a tuberculosis sanatorium, to house incipient cases, a decision must be rade as to whether the advantage of having patients near at hand and accessible to their friends overweighs the possible benefit to be obtained by placing the institution in a region more favorable from a climate point of view, but far from the patients' homes. It is now generally agreed that in the treatment of tuberculosis excellent results can be obtained in practically any section of the country.

There is probably no more suitable site to be found in the state of Illinois than the one selected. The piece of land comprises forty-eight acres of level plateau, thus giving ample space for expansion as well as plenty of space for formal gardens in the immediate surroundings and walks leading to thick wooded paths for the patients to ramble through for pastime. Some of the land might even be cultivated, if desired. The rock rises directly up to a height of seventy-five feet above the river and surrounding country, thus giving an unobstructed view for miles up and down the valley of the Illinois. Below the rock lies the river which is very handy for boating and fishing, launch trips to the neighboring historical and pisturesque spots will furnish fine pastime for patients.

Transportation:- The transportation facilities could hardly be better for at the foot of the rock on the north running east and west lie the public highway, the Chicago, Ottawa, and Peoria Railway, with cars every twenty

minutes and the main line of the Rock Island Railroad, all within a few feet of each other. Along with these also lies the Illinois-Michigan Canal, although of little importance, still used for transportation to a small extent.

Style:- In this design it was desirable to give a rustic character of the building, without making it mean or lacking in detail. The buildings might easily become too elaborate, but from study it is evident that such a building is most effective when secondary to its natural surroundings. Therefore, the group has been kept plain and simple in outline, beauty being gained by mere proportion, and dark shadows and plain surfaces, so that, instead of competing with nature, it would be in keeping with its surroundings and would become a part of the landscape. Beauty and simplicity has been the aim.

However simple the general effect, there must be somewhat of gayety in the design and this was attempted by a careful selection of ornaments, such as around the windows and the vases upon the balustrade, which form a wave line, expressive of gayety with certain spots of interest. The rustic scheme has been carried out by means of the brackets under the cornice, flower boxes, etc. The open balconies towers, roof gardens and solariums all add to this end.

Grand Layout:- The formal grand layout tends to show relation of the various buildings to one another and to bind them together. The contrasting walks, grassplots, fountains, pools,etc., all add to the general effect of gayety

which the designer endeavored to gain. An attempt has been made to gradually diminish the formality of treatment so as to gradually fade out into the informal forest paths and to the rocky cliffs of the river bank.

Material:- Stucco has been chosen as the material with which the exterior should be finished, both on account of the character of its surfaces and its keeping with the surrcundings of nature.

Grouping:- In studying the grouping of these buildings the plan shown was adopted as being the best arrangement for sunlight, air cleanliness and the best adapted to the natural surroundings.

The administration building faces directly east and looms up at once as the headquarters and offices to anyone coming up the road, for the road is directly perpendicular to it. Out in front is a wide terrace running the full length of the building. Ther a large open porch. The dining room is kept out on the river where an excellent view is obtainable while the service is kept back in a separate building entirely out of sight of the patients' quarters and a distinct department of its own consisting of lounging, dining, store, kitchen and toilet rooms on the first floor and bedrooms and bath on the second floor. The administration building is the entrance to the hospital, the center of administration, the business office and home of the superintendent, nurses and matron, the meeting place of the corporation and committees and the only place where the public have a right to enter until further

permission is granted for further inspection. Matron, superintendents, or nurses must have the privilege of entertaining guests at times, and it is absolutely impossible to do so with any comfort either to themselves or their patients, where absolute quiet must be maintained. There must be times for relaxation for both officers and nurses, and if it is impossible to talk freely and laugh once in a while, the building is certainly not well planned. For these reasons, the administration building has been placed where it cannot be missed by strangers and where a good view is obtained from all parts of it and, most important, it is a distinct separate building where officers, nurses home and amusements are located, thus, keeping all the noise confined to one building and distinct from the patients' quarters. The nurses' dining room is equally hardy to the service as is the main dining room. The administration building has been kept far enough back from the patients' quarters so its shadow will not fall on the building in any season of the year.

The patients' quarters consist of two buildings, one for men and one for the women. The building faces the south, thus allowing a maximum of sunlight at all times of the day. The open porch is high so that the sunlight enters each room and shines on every wall at sometime of the day. Each patient has a night room, a dressing room and toilet and an open porch. The night room is for sleeping in during the inclement weather and is not heated, having plenty of ventilation being practically all glass on the front. The door is wide enough for the patient to have his bed outside during good weather. The dressing room

has a shower, lavatory and toilet in connection as well as a large wardrobe which has no doors but is open, allowing air to circulate among garments as they hang there. There is no corridor in the building to allow stagnant air to gather in. The corridor consists of an open corridor and access is gained to the various rooms from this. Thus, direct cross ventilation is obtained through each suite of rooms. Each patient has his own private porch with room enough for his wheeled chair without interfering with the nurses walking up and down the corridor. There are no stair wells to allow air to go from one floor to the other into the corridors. At each end of the series of rooms are dietians room and around it runs an incline so patients may easily be wheeled from one floor to the other. This solid wall at the end serves to stop the wind from sweeping up and down the porches lengthwise and forms a suitable means for stopping the rotation of openings. The two floors are similar.

Medical Building:- This building is where the direct administration of the patients is carried on for here the nurses on duty remain and also the patients who are unable to stand outdoor air. The front part of the building is devoted to stairs, office and lounging room while north of the hall and distinctly a department of its own, lies the laboratory with the doctors' and nurses' rooms combined while on the second floor is the operating room and its necessary rooms combined. The operating room runs through two stories and has large windows and a skylight for the north light.

A service road runs up the rear of this building so in case of a death, the death wagon may come and get the body without patients ever knowing it.

Solarium:-- The solarium is placed down on the hillside, thus giving it a wonderful view and plenty of sunlight.

At the entrance of the road into the group is a gate lodge and a couple of rooms for the occupants so a man may live here and see that only those desirable may enter.

CONSTRUCTION.

The walls of all the buildings should be built of hollow tile, because of its inpenetravility to heat, and fireproof qualities. Stucco should be applied directly to the exterior and should be of a warm yellow tone with rough finish. The interior is furst furred and then plastered to insure dryness.

The kitchen, toilet and operating rooms should have tile floors.

The interiors of the buildings should be plain and all wood trin eliminated where possible. All corners and angles should be rounded so as to be easily cleaned.

All doors should be at least three foot six inches wide so as to permit of a cot passing through.

All roofs are to be of Spanish clay tile.

As there are no extremely large spans the construction of the buildings are comparatively simple and do not require any description here.

HEATING.

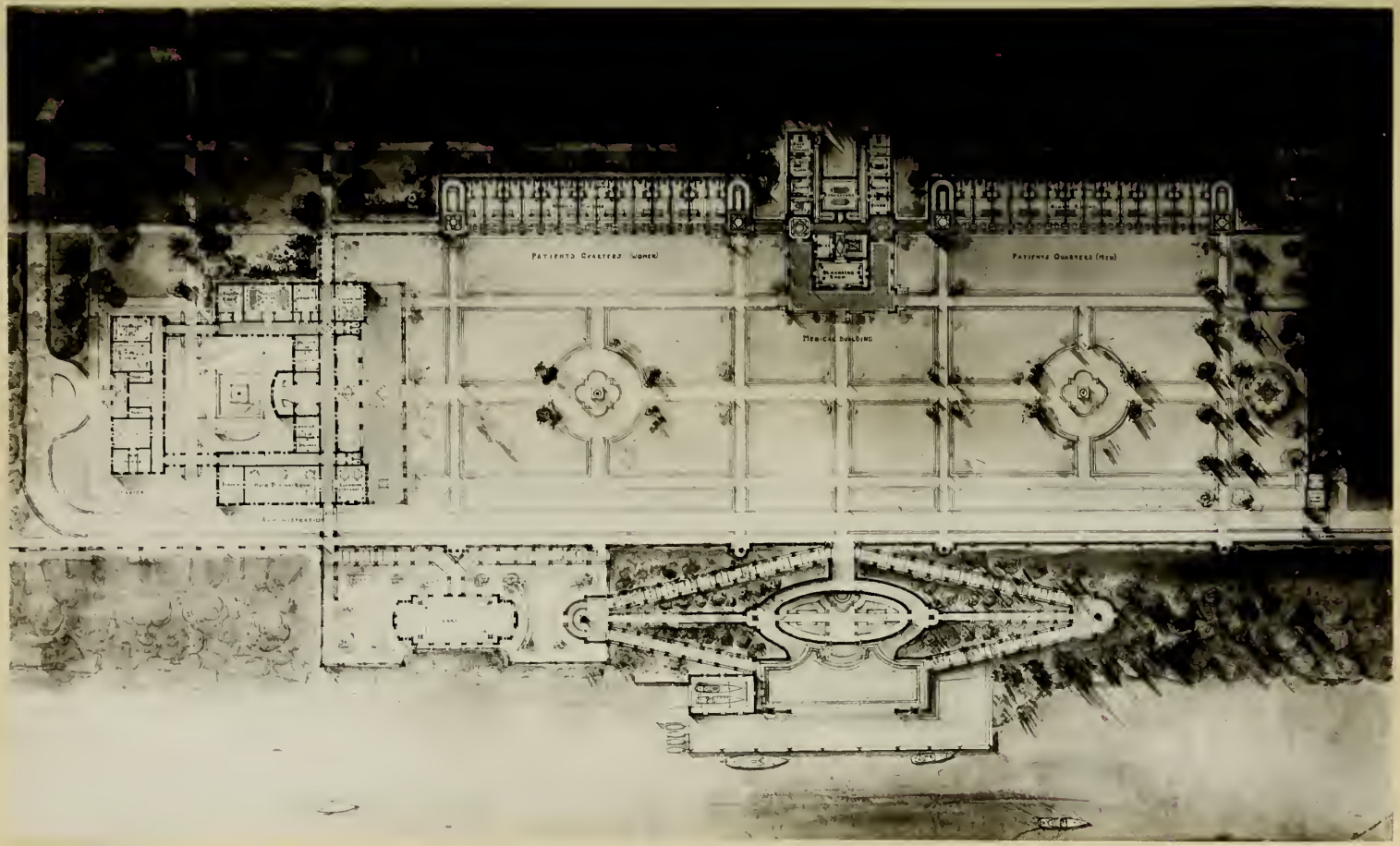
High pressure boilers with steam engines shall be used and exhaust steam used for heating. The power house may be placed behind the group on the north side of the rock, thus avoiding the heat from the boilers and the noise and dust which would prove very disagreeable if placed in the basement of the buildings. The power plant should be placed below the site of all the buildings of the group to be heated, in order to allow the return by gravity, of condensed steam from the heating apparatus. By placing it on the north bank of the bluff a spur can easily be run from the railroad and coal and ashes may be handled with little expense. The buildings should be connected to the power house by a concrete tunnel three feet wide by six feet high and all pipes and wires run thrcugh here, thus alloving easy inspection at all times. The power house will be of reinforced concrete, one story high and divided into an engine room, boiler room, oil room, and dressing room, containing toilets and shower baths. The coal bins should also be of concrete, having a capacity of six or eight car loads of coal, placed on the cutside of the building and arranged so that coal can be dumped directly into them from the cars.

LIGHTING.

The power for lighting may be obtained from the high tension line which passes the foot of the rock.

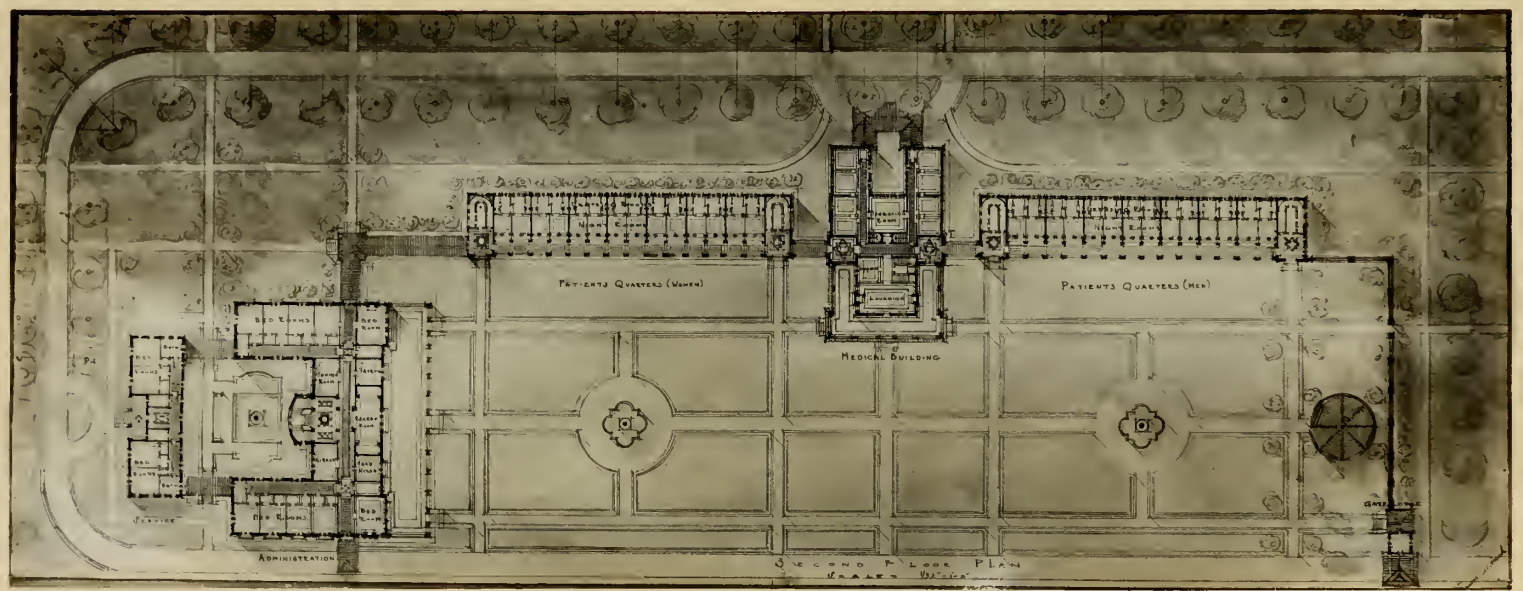
Lights should be of amber hues as conducive to lighter spirits among the patients. Lights for halls, stairs and corridors should be as far as possible ceiling dishes, this being the form easiest kept clean, and the glass bowl, should be used with a ground or acid finish on inside to soften light. In the administration building the hanging brackets should be used on the first floor and the ceiling dishes in corridors and stairs.

A cluster of carbon filament lamps of 120-200 candle power should be hung at a height of about twenty-four inches above the operating table. They should be placed in a fluted glass reflector then no shadows can be cast.


PATIENTS QUARTERS (WOMEN)
PATIENTS QUARTERS (MEN)
MEDICAL BUILDING

A · TVBERCVLOSIS · SANATORIVM

A TVBERCVLOSIS SANATORIVM



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